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UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/844,581	04/26/2001	Carl A. Waldspurger	Vmware11	1803

			EXAMINER
25877	7590	09/16/2004	ALI, SYED J

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ART UNIT	PAPER NUMBER
2127	

DATE MAILED: 09/16/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO 90C (Rev 10/03)

	Application No.	Applicant(s)
Office Action Summary	09/844,581	WALDSPURGER ET AL.
	Examiner	Art Unit	
	Syed J Ali	2127	

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>26 April 2001</u>.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-32</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>1-32</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>26 April 2001</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

1.   Claims 1-32 are pending in this application.

Claim Rejections - 35 USC § 112

2.   The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3.   **Claims 8 and 25-26 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.**

4.   The following terms lack antecedent basis:

a.   In line 3 of claim 25, "the step of filtering".

b.   In lines 6-7 of claim 25, "the transformation-triggering criterion".

5.   The following claim language is indefinite:

a.   In claim 8, it is unclear what the meaning of "in the presence in the I/O data of a copy protection indication" means. It appears to be a grammatical error of some sort that makes it difficult to identify how the claim is limited.

b.   In claim 26, it is rejected for being dependent upon indefinite claim 25, as discussed above in paragraph 4.

Claim Rejections - 35 USC § 102

6.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the

basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7.   **Claims 1-3, 9-11, and 25-32 are rejected under 35 U.S.C. 102(e) as being anticipated**

by Cota-Robles et al. (US 2002/0143842) (hereinafter Cota-Robles).

8.   As per claim 1, Cota-Robles teaches the invention as claimed, including a method for

controlling input/output [I/O] operations of a user's computer comprising the following steps:

implementing the user's computer as a virtual machine [VM] (paragraphs 0019-0020);

including a virtual machine monitor [VMM] as a VM-transparent interface between the

VM and a physical computer system that includes at least one device (paragraphs 0019-0020);

in the VMM:

sensing a request for an I/O operation between the VM and the device (paragraphs

0027, 0029, 0042, 0047);

performing a predetermined transformation of I/O data passing between the VM

and the device (paragraphs 0015, 0027, 0047);

the transformation of the I/O data thereby being undefeatable by any user action via the

VM (paragraphs 0025, 0027, 0029, 0047).

9.   As per claim 2, Cota-Robles teaches the invention as claimed, including a method as in

claim 1, in which:

the device is a display (paragraph 0015);

the I/O data is VM display data output from the VM and intended for display (paragraph

0015, 0027, 0029, 0042, 0047); and

the predetermined transformation is a replacement of at least a portion of the VM display

data with non-defeatable display data stored external to the VM but accessible to the VMM

(paragraphs 0015, 0027, 0047);

further including the step of displaying the VM display data with the non-defeatable

display data overlaid (paragraphs 0015, 0025, 0027, 0029, 0047).

10.   As per claim 3, Cota-Robles teaches the invention as claimed, including a method as in

claim 1, further including the following steps:

filtering the I/O data with respect to at least one predetermined filtering condition

(paragraphs 0027, 0029, 0042, 0047); and

performing the predetermined transformation of the I/O data only when the filtering

condition is met (paragraphs 0027, 0029, 0042, 0047).

11.   As per claim 9, Cota-Robles teaches the invention as claimed, including a method as in

claim 1, in which the predetermined transformation comprises insertion into the I/O data of a

source indication associated with the VM (paragraphs 0027, 0029, 0042, 0047).

12.   As per claim 10, Cota-Robles teaches the invention as claimed, including a method as in

claim 1, in which the transformation is time-varying (paragraphs 0015, 0023).

13.   As per claim 11, Cota-Robles teaches the invention as claimed, including a method as in

claim 1, in which the device is a network connection device (paragraphs 0015, 0023).

14.   As per claim 25, Cota-Robles teaches the invention as claimed, including a method as in

claim 1, in which:

    the VM supports a plurality of I/O modes (paragraphs 0015, 0023);

    the step of filtering is performed on I/O data corresponding to a first one of the plurality

of I/O modes (paragraphs 0027, 0029, 0042, 0047); and

    the predetermined transformation is applied to I/O data in a second one of the I/O modes

when the I/O data in the first I/O mode satisfies the transformation-triggering criterion

(paragraphs 0015, 0027, 0029, 0042, 0047).

15.   As per claim 26, Cota-Robles teaches the invention as claimed, including a method as in

claim 25, in which the I/O modes include a video mode and an audio mode (paragraphs 0015,

0023).

16.   As per claim 27, Cota-Robles teaches the invention as claimed, including a method for

controlling input/output (I/O) of a user's computer comprising the following steps:

implementing the user's computer as a virtual machine [VM] (paragraphs 0019-0020);

including a virtual machine monitor [VMM] as a VM-transparent interface between the VM and a physical computer system that includes at least one device that carries out an I/O operation on the basis of device control data (paragraphs 0019-0020, 0027, 0029, 0042, 0047);

storing the device control data associated with the VM in a buffer in the VMM (paragraphs 0019-0020, 0027, 0029, 0042, 0047);

upon sensing a transformation command from an administrative system external to the VM, entering replacement data into at least a portion of the buffer (paragraphs 0027, 0029, 0042, 0047);

the entry of the replacement data thereby being undefeatable by any user action via the VM (paragraphs 0025, 0027, 0029, 0047).

17.   As per claim 28, Cota-Robles teaches the invention as claimed, including a system for controlling input/output [I/O] operations of a user's computer, comprising:

a virtual machine [VM] constituting the user's computer (paragraphs 0019-0020);

a virtual machine monitor [VMM] forming a VM-transparent interface between the VM and a physical computer system that includes at least one device (paragraphs 0019-0020);

the VMM including means:

for sensing a request for an I/O operation between the VM and the device (paragraphs 0027, 0029, 0042, 0047); and

for performing a predetermined transformation of I/O data passing between the VM and the device (paragraphs 0015, 0027, 0047);

the transformation of the I/O data thereby being undefeatable by any user action via the VM (paragraphs 0025, 0027, 0029, 0047).

18.   As per claim 29, Cota-Robles teaches the invention as claimed, including a system as in claim 28, in which the device is a display and the I/O data is VM display data (paragraph 0015).

19.   As per claim 30, Cota-Robles teaches the invention as claimed, including a system as in claim 29, further comprising:

a display buffer within the VMM for storing the VM display data that is output from the VM and is intended for display (paragraph 0015, 0027, 0029, 0042, 0047); and

transformation means located within the VMM for replacing at least a portion of the VM display data stored in the display buffer with non-defeatable display data (paragraph 0015, 0027, 0029, 0042, 0047);

in which the display is provided for displaying the contents of the display buffer (paragraphs 0015, 0023, 0027, 0042, 0047).

20.   As per claim 31, Cota-Robles teaches the invention as claimed, including a system as in claim 28, in which the device is a data storage device (paragraphs 0015, 0023).

21.   As per claim 32, Cota-Robles teaches the invention as claimed, including a system as in claim 28, in which the device is a network connection device (paragraphs 0015, 0023).

Claim Rejections - 35 USC § 103

22.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

23.   **Claims 4-5, 8, and 21-24 are rejected under 35 U.S.C. 103(a) as being unpatentable**

over Cota-Robles in view of O'Neil et al. (USPN 5,987,440) (hereinafter O'Neil).

24.   As per claim 4, O'Neil teaches the invention as claimed, including a method as in claim

3, in which the filtering condition is that the I/O data includes at least one predetermined

restricted term (Abstract, col. 56 lines 5-40; col. 57 line 60 - col. 58 line 63).

25.   It would have been obvious to one of ordinary skill in the art to combine Cota-Robles and

O'Neil since Cota-Robles, while presenting a method of representing a processing device in a

virtual machine to control input and output, does not present specific types of input/output

devices, or how certain features therein would be implemented. Modern computing is embodied

within a networked environment to the point where it is nearly commonplace. With this advent

in computing, protecting the integrity of data is of utmost importance. O'Neil provides a method

of protecting information security within a virtual private network, or other type of network, such

that personal data or other sensitive data can be trusted and more securely transferred.

26.   As per claim 5, O'Neil teaches the invention as claimed, including a method as in which the filtering condition is that the I/O data is from a predetermined restricted source (Abstract, col. 56 lines 5-40; col. 57 line 60 - col. 58 line 63).

27.   As per claim 8, O'Neil teaches the invention as claimed, including a method as in claim 3, in which the predetermined filtering condition in the presence in the I/O data of a copy protection indication (Abstract, col. 56 lines 5-40; col. 57 line 60 - col. 58 line 63).

28.   As per claim 21, O'Neil teaches the invention as claimed, including a method as in claim 1, in which:

the device is a network connection device (Abstract, col. 56 lines 5-40; col. 57 line 60 - col. 58 line 63);

the requested I/O operation is a transfer of data between the VM and the network connection device (Abstract, col. 56 lines 5-40; col. 57 line 60 - col. 58 line 63); and

the step of performing the predetermined transformation comprises changing at least a portion of the data during the transfer between the VM and the network connection device (Abstract, col. 56 lines 5-40; col. 57 line 60 - col. 58 line 63).

29.   As per claim 22, O'Neil teaches the invention as claimed, including a method as in claim 21, in which the step of performing the predetermined transformation of the I/O data comprises encrypting data written by the VM to the network connection device and decrypting data read from the network connection device by the VM (Abstract, col. 56 lines 5-40; col. 57 line 60 - col. 58 line 63).

30.   As per claim 23, O'Neil teaches the invention as claimed, including a method as in claim 21 , in which the step of performing the predetermined transformation of the I/O data comprises compressing data written by the VM to the network connection device and decompressing data read from the network connection device by the VM (Abstract, col. 56 lines 5-40; col. 57 line 60 - col. 58 line 63).

31.   As per claim 24, O'Neil teaches the invention as claimed, including a method as in claim 1, in which the step of performing the predetermined transformation of the I/O data comprises cryptographic transformation of the I/O data (Abstract, col. 56 lines 5-40; col. 57 line 60 - col. 58 line 63).

32.   **Claims 6-7, 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cota-Robles in view of Pasieka (USPN 6,587,945).**

33.   As per claim 6, Pasieka teaches the invention as claimed, including a method as in claim 3, in which:

the I/O data includes image data (col. 4 line 58 - col. 5 line 17);

the step of filtering the I/O data comprises detecting the presence of a representation of a

target image within the image data (col. 4 line 58 - col. 5 line 17); and

the predetermined transformation is substitution of a representation of a replacement

image in place of the representation of the target image (col. 4 line 58 - col. 5 line 17).

34.   It would have been obvious to one of ordinary skill in the art to combine Cota-Robles and

Pasieka since Cota-Robles, while presenting a method of representing a processing device in a

virtual machine to control input and output, does not present specific types of input/output

devices, or how certain features therein would be implemented. In systems that utilize virtual

machines, Internet applications or other network computing is very common. Along with this

type of processing comes a transfer of image data or other display data. While Cota-Robles

mentions this type of input/output briefly, it does not specifically address how the transmission

of these images would be protected. Pasieka provides such a method of digitally signing an

image before it is transferred. such that the origin and integrity of a document or image can be

verified before it is displayed on a user's screen.

35.   As per claim 7, Pasieka teaches the invention as claimed, including a method as in claim

6, in which:

the I/O data is in a non-character image format (col. 4 line 58 - col. 5 line 17);

the target image is a representation of a restricted character string (col. 4 line 58 - col. 5

line 17); and

the step of filtering the I/O data comprises applying character recognition to the I/O data (col. 4 line 58 - col. 5 line 17).

36. As per claim 15, Pasieka teaches the invention as claimed, including a method as in claim 1, in which:

the device is a display (col. 4 line 58 - col. 5 line 17);

the display renders data stored in a display map (col. 4 line 58 - col. 5 line 17); and

the step of performing the predetermined transformation comprises altering a selected portion of the display map (col. 4 line 58 - col. 5 line 17).

37. As per claim 16, Pasieka teaches the invention as claimed, including a method as in claim 15, in which the step of altering the selected portion of the display data comprises substituting predetermined, non-defeatable display data for the selected portion (col. 4 line 58 - col. 5 line 17).

38. As per claim 17, Pasieka teaches the invention as claimed, including a method as in claim 15, in which the step of altering the selected portion of the display data comprises changing all occurrences in the display map of a display color to a predetermined replacement color (col. 6 lines 15-54).

39. **Claims 12-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cota-Robles in view of Narlikar et al. (US 2002/0069241).**

40.   As per claim 12, Narlikar teaches the invention as claimed, including a method as in claim 11, in which the predetermined transformation is a bandwidth limiting of the I/O data being transferred between the VM and the network connection device (Abstract, paragraphs 0003-0005, 0012, 0019).

41.   It would have been obvious to one of ordinary skill in the art to combine Cota-Robles and Narlikar since in a networked computing environment, processing bottlenecks can lead to loss of data, inconsistent processing, or other failures. This particular type of input/output processing must be accounted for in a network environment. Often, such issues are handled by proxy servers that distribute loads evenly among servers, such that one node does not handle an excessive amount of requests. Pasieka provides such a proxy method, wherein if a request is directed to a heavily loaded node, the request is redirected to a proxy server, which determines the best way to distribute that request. Thus, processing throughput can be improved giving rise to more reliable and efficient processing.

42.   As per claim 13, Narlikar teaches the invention as claimed, including a method as in claim 11, in which:

the requested I/O operation is a transfer of the I/O data between the VM and the network connection device (Abstract, paragraphs 0003-0005, 0012, 0019); and

the predetermined transformation is a time delay of the transfer (Abstract, paragraphs 0003-0005, 0012, 0019).

43. As per claim 14, Narlikar teaches the invention as claimed, including a method as in claim 11, in which:

the requested I/O operation is a transfer of the I/O data from the VM to a first destination address via the network connection device (Abstract, paragraphs 0003-0005, 0012, 0019);

the predetermined transformation is a redirection of the I/O data to a second destination address different from the first (Abstract, paragraphs 0003-0005, 0012, 0019).

44. **Claims 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cota-Robles in view of Samar (US 2002/0078049).**

45. As per claim 18, Samar teaches the invention as claimed, including a method as in claim 1, in which:

the device is a data storage device (Abstract, 0029, 0030, 0040, 0041);

the requested I/O operation is a transfer of data between the VM and the storage device (Abstract, 0029, 0030, 0040, 0041); and

the step of performing the predetermined transformation comprises changing at least a portion of the data during the transfer between the VM and the storage device (Abstract, 0029, 0030, 0040, 0041).

46.   It would have been obvious to one of ordinary skill in the art to combine Cota-Robles and

Samar since Cota-Robles, while presenting a method of representing a processing device in a

virtual machine to control input and output, does not present specific types of input/output

devices, or how certain features therein would be implemented. Modern computing utilizes data

stores and databases to store sensitive data. With this advent in computing, protecting the

integrity of the data is of utmost importance. Samar provides a method of determining if data

that is to be stored is of a sensitive nature, and if so, encrypting the data such that it can be

protected against unauthorized access.

47.   As per claim 19, Samar teaches the invention as claimed, including a method as in claim

18, in which the step of performing the predetermined transformation of the I/O data comprises

encrypting data written by the VM to the data storage device and decrypting data read from the

data storage device by the VM (Abstract, 0029, 0030, 0040, 0041).

48.   As per claim 20, Samar teaches the invention as claimed, including a method as in claim

18, in which the step of performing the predetermined transformation of the I/O data comprises

compressing data written by the VM to the data storage device and decompressing data read

from the data storage device by the VM (Abstract, 0029, 0030, 0040, 0041).
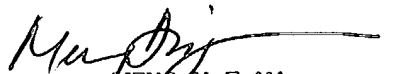
Conclusion

49.   Any inquiry concerning this communication or earlier communications from the examiner should be directed to Syed J Ali whose telephone number is (571) 272-3769. The examiner can normally be reached on Mon-Fri 8-5:30, 2nd Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Meng-Ai T An can be reached on (571) 272-3756. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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September 7, 2004

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